The Federal Maglev Program

John T. Harding
Federal Railroad Administration
18 October 2004


01

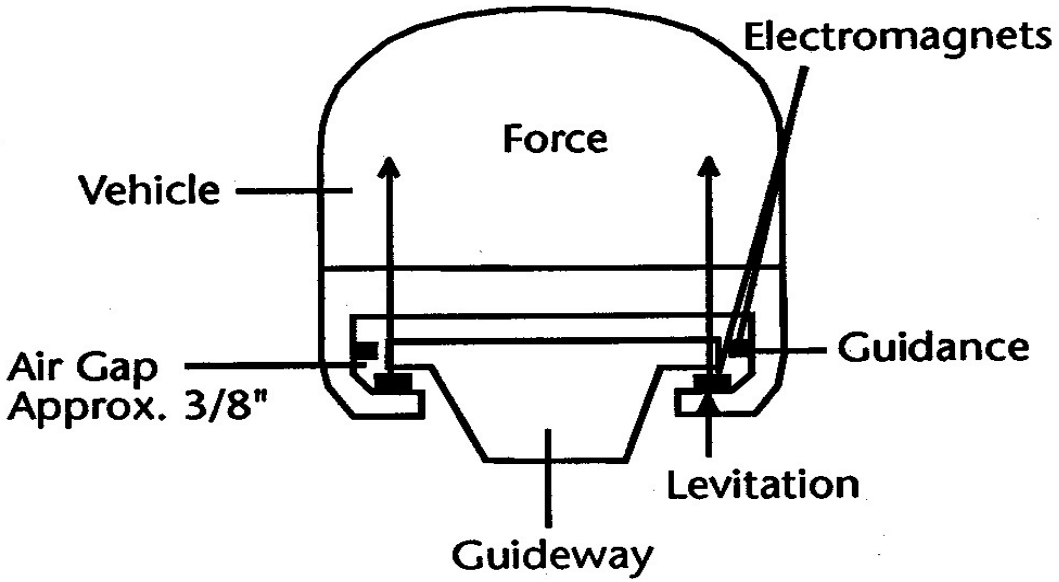


Figure ES-2. Electromagnetic Maglev

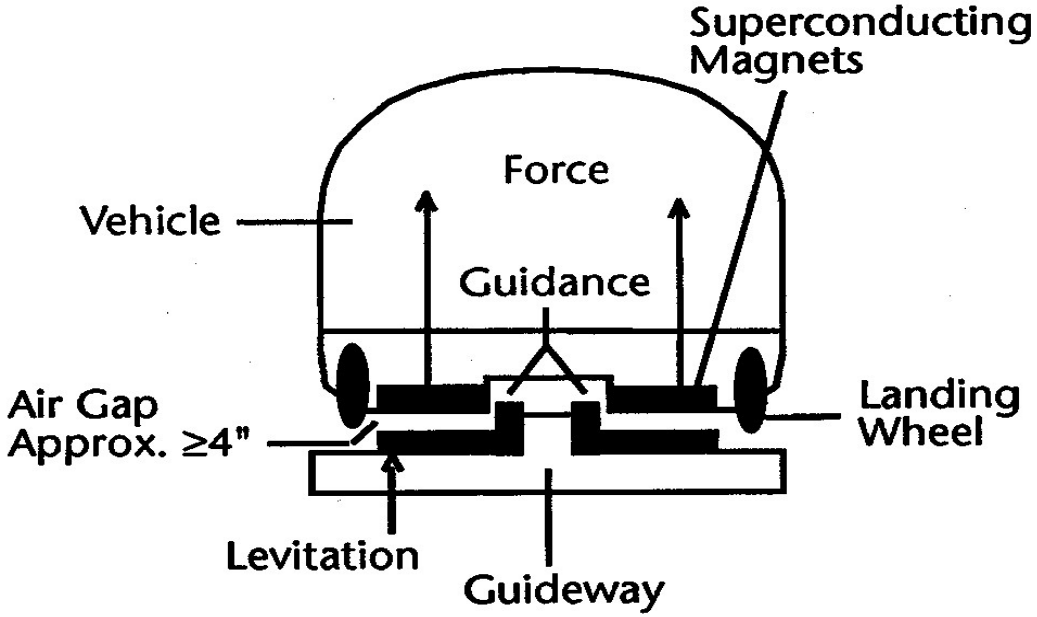
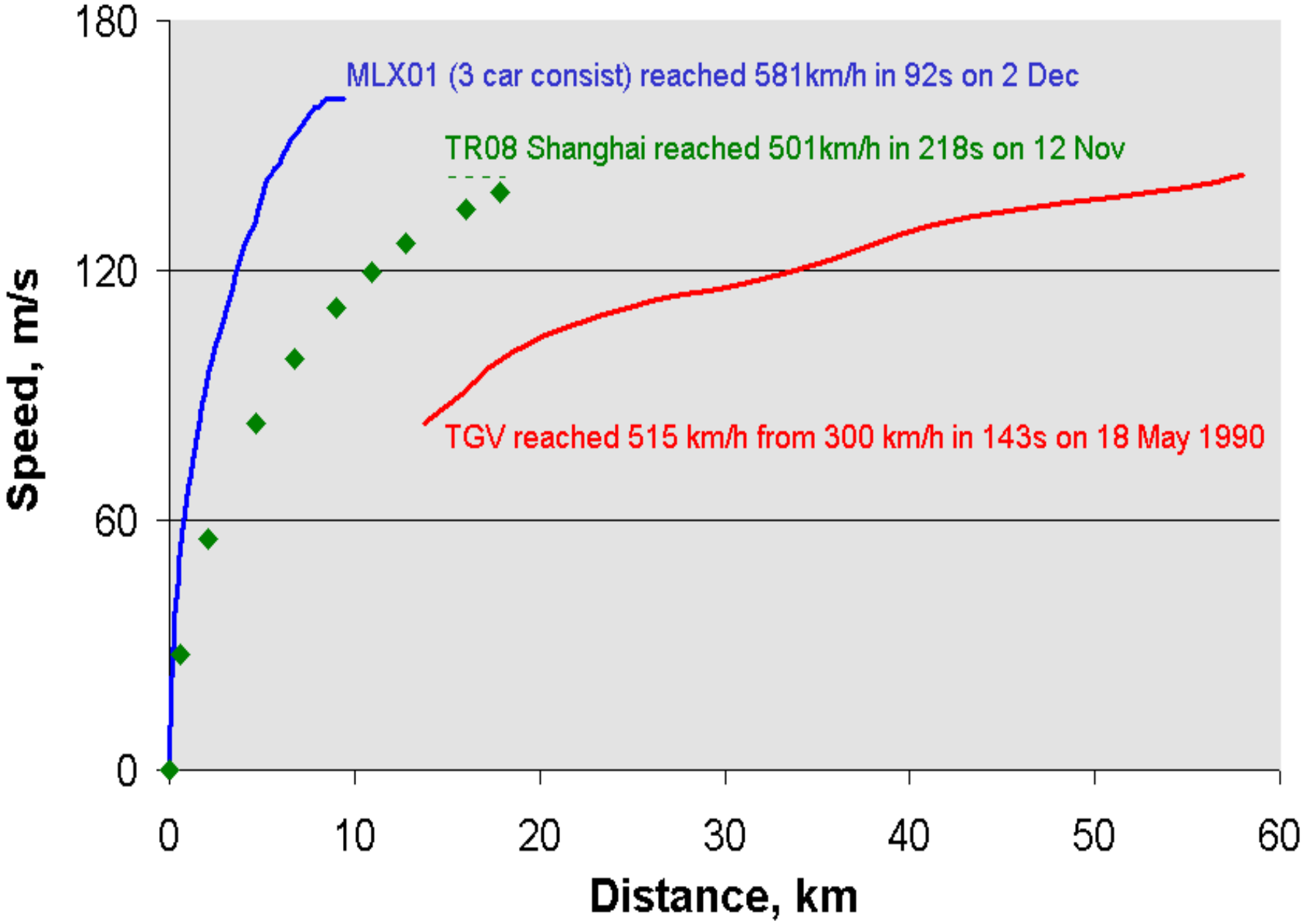


Figure ES-3. Electrodynamic Maglev

ADVANTAGES OF MAGLEV

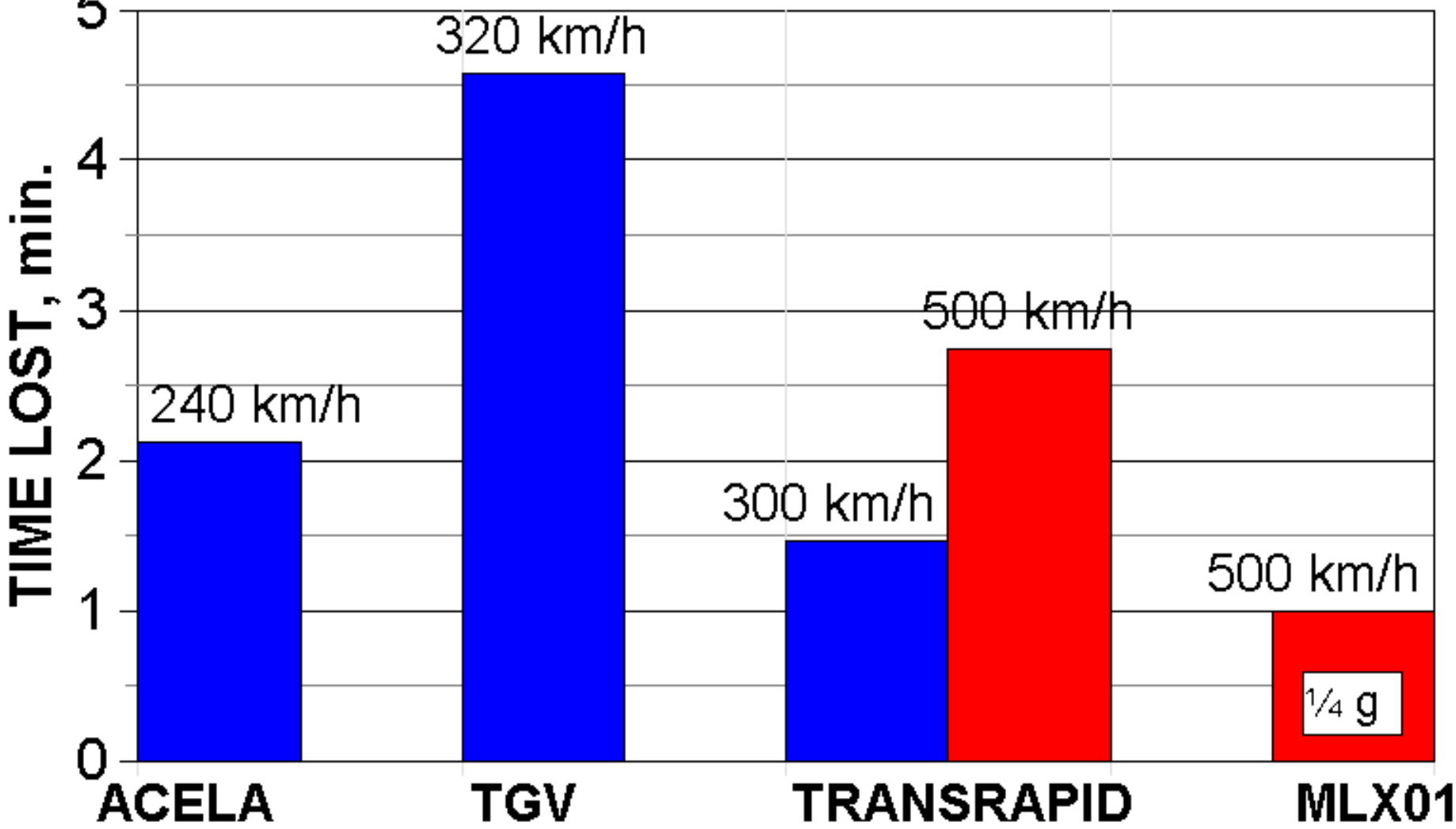
- Speeds in excess of 500 km/h (310 mph)
- Higher acceleration/steeper grades, because traction does not depend on friction
- Reduced maintenance (no moving parts)
- Noiseless at lower speeds

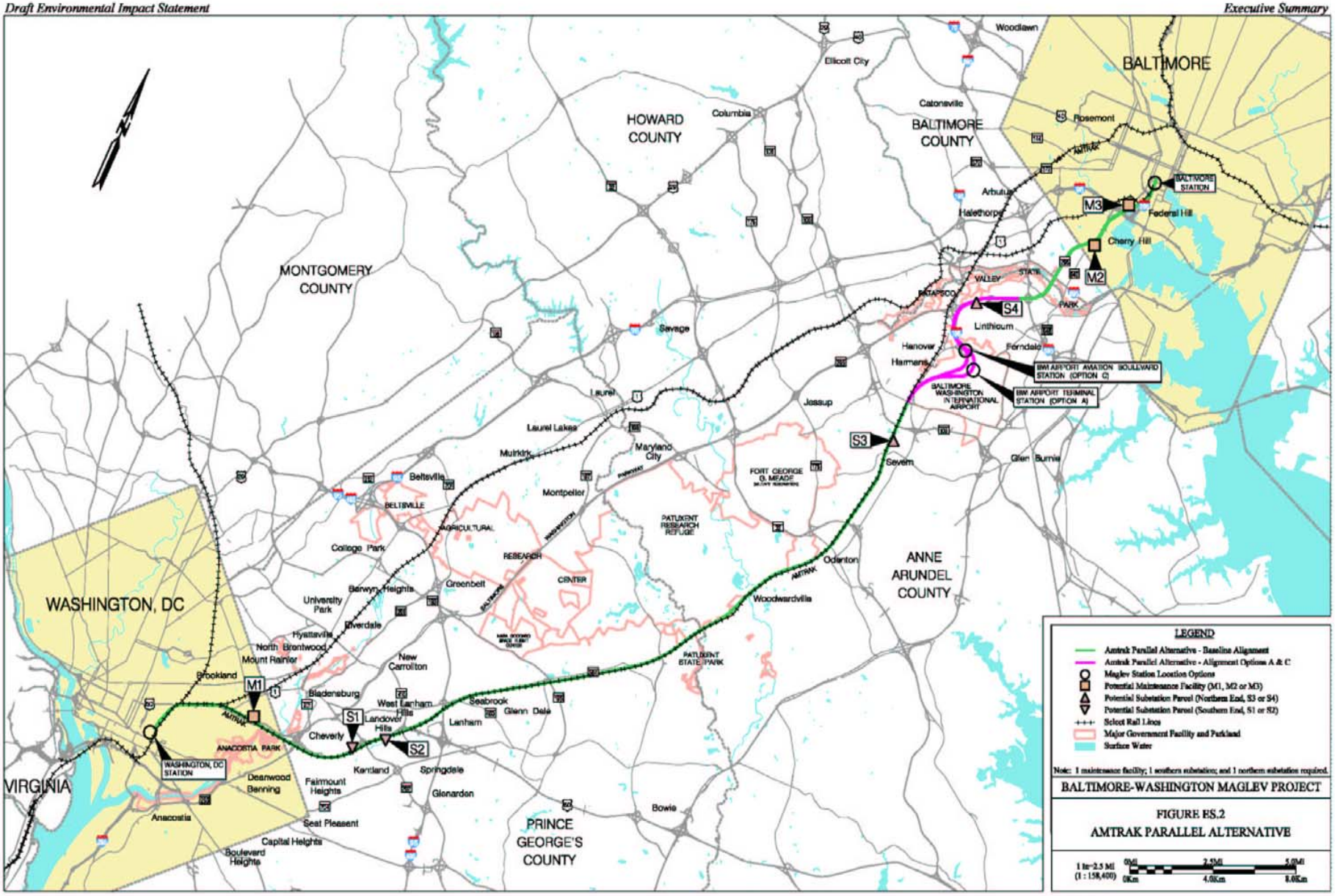
Demonstrated Acceleration- Record Runs

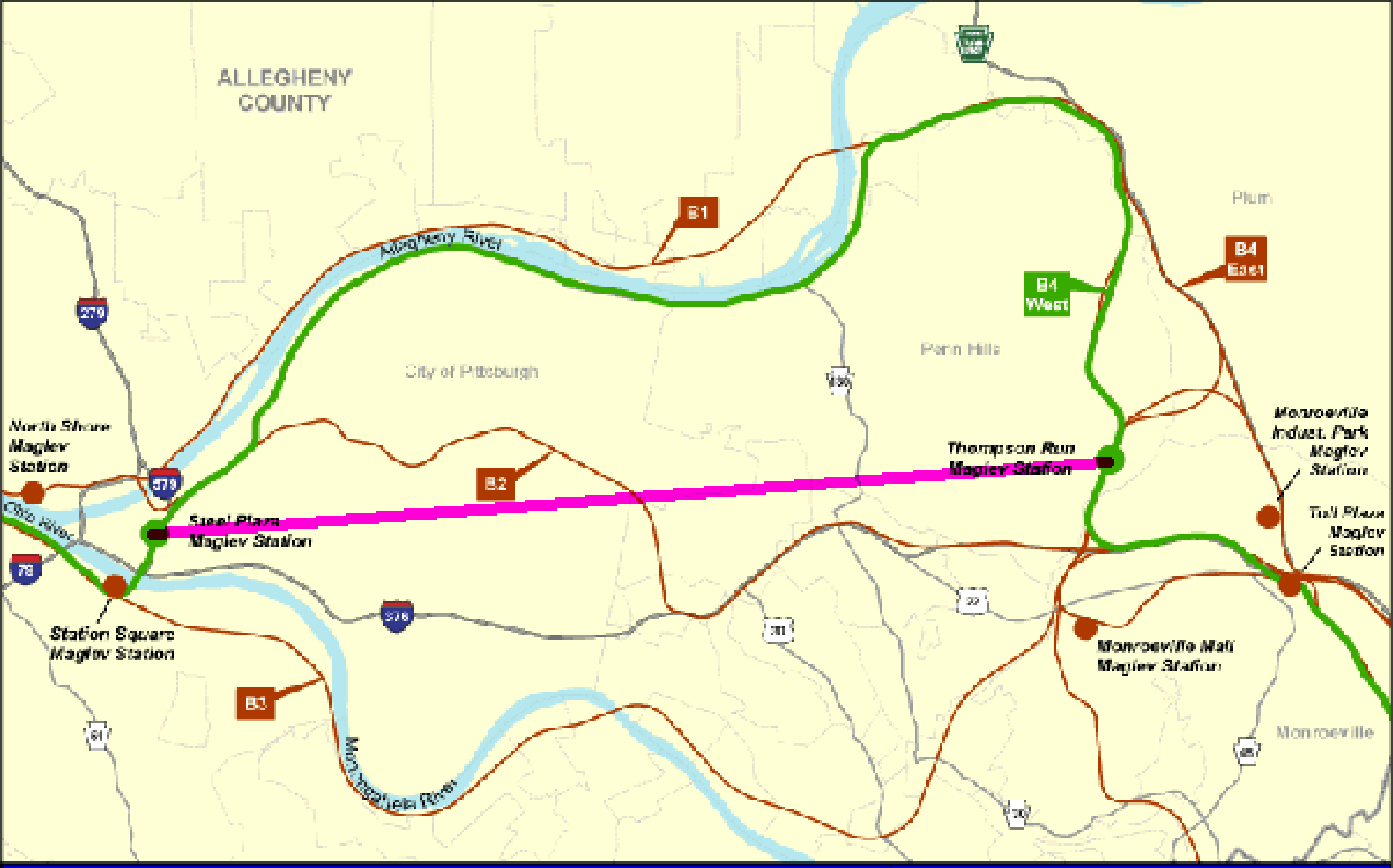


ELECTRIC TRAIN PERFORMANCE

(TIME LOST IN STOP, EXCLUDING DWELL)



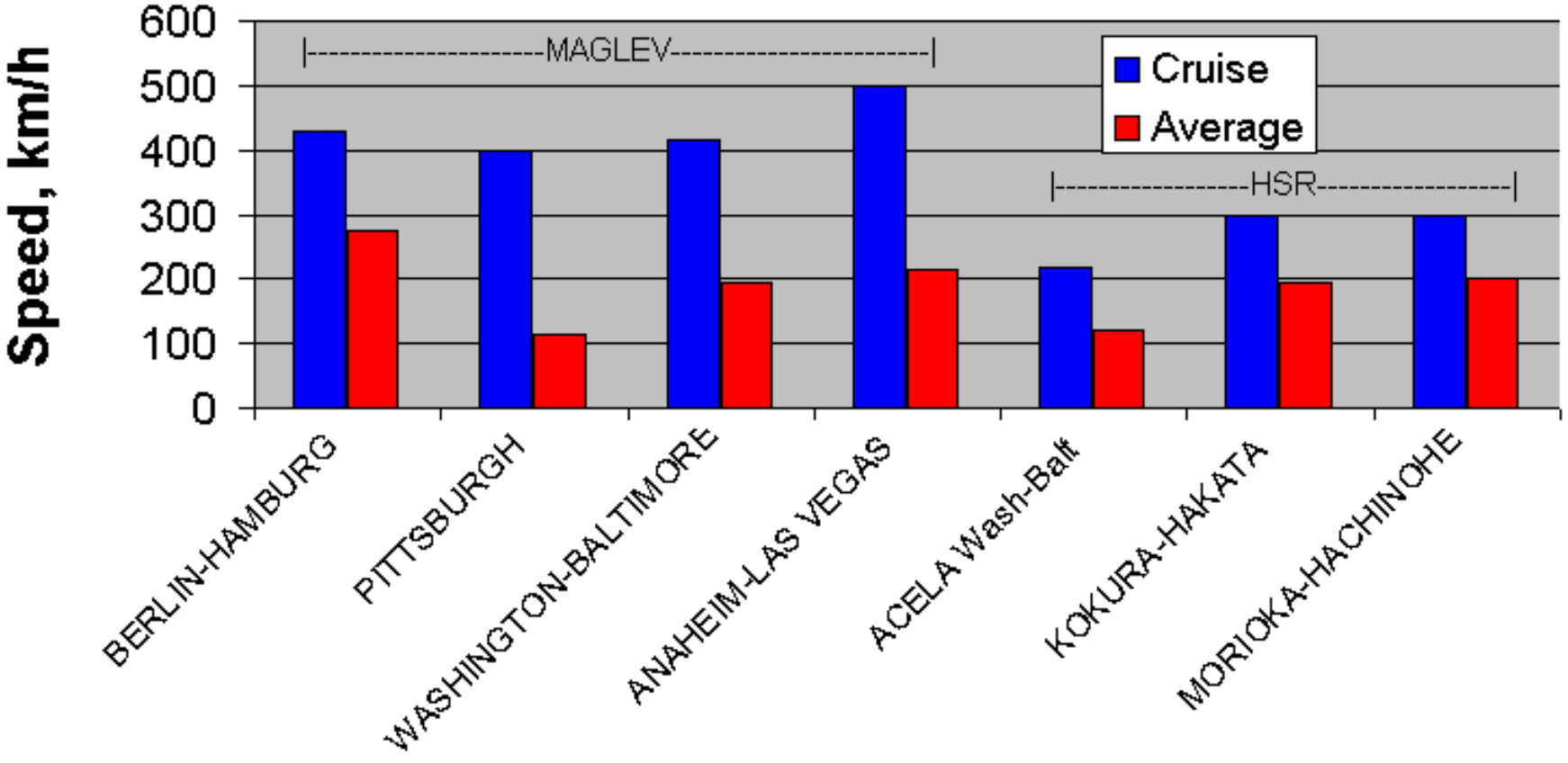

BALTIMORE
HOWARD COUNTY
BALTIMORE COUNTY
MONTGOMERY COUNTY
WASHINGTON, DC
ANNE ARUNDEL COUNTY
PRINCE GEORGE'S COUNTY
VIRGINIA
Woodlawn
Ellicott City
Columbia
Catonsville
Rosemont
Arbutus
Halethorpe
Cherry Hill
Federal Hill
BALTIMORE STATION
M1
M2
M3
S1
S2
S3
S4
Savage
Laurel
Laurel Lakes
Maryland City
Jessup
Hanover
Harmans
Linthicum
Ferndale
Glen Burnie
Severn
Odenton
Woodwardville
Montpelier
Beltsville
College Park
Greenbelt
University Park
Berwyn Heights
Riverdale
Hyattsville
North Brentwood
Mount Rainier
Brookland
New Carrollton
Bladensburg
West Lanham Hills
Landover Hills
Cheverly
Lanham
Seabrook
Glenn Dale
Kentland
Springdale
Glenarden
Fairmount Heights
Seat Pleasant
Capital Heights
Boulevard Heights
Deanwood
Banning
Anacostia
Bowie
ANACOSTIA PARK
WASHINGTON, DC STATION
BWI AIRPORT AVIATION BOULEVARD STATION (OPTION C)
BWI AIRPORT TERMINAL STATION (OPTION A)
BALTIMORE WASHINGTON INTERNATIONAL AIRPORT
FORT GEORGE G. MEADE
PATUXENT RESEARCH REFUGE
PATUXENT STATE PARK
AGRICULTURAL RESEARCH CENTER
PATAPSCO VALLEY STATE PARK
LEGEND
Amtrak Parallel Alternative - Baseline Alignment
Amtrak Parallel Alternative - Alignment Options A & C
Maglev Station Location Options
Potential Maintenance Facility (M1, M2 or M3)
Potential Substation Parcel (Northern End, S3 or S4)
Potential Substation Parcel (Southern End, S1 or S2)
Select Rail Lines
Major Government Facility and Parkland
Surface Water
Note: 1 maintenance facility; 1 southern substation; and 1 northern substation required.
BALTIMORE-WASHINGTON MAGLEV PROJECT
FIGURE ES.2
AMTRAK PARALLEL ALTERNATIVE
1 in=2.5 Mi
(1 : 158,400)
0Mi 2.5Mi 5.0Mi
0Km 4.0Km 8.0Km

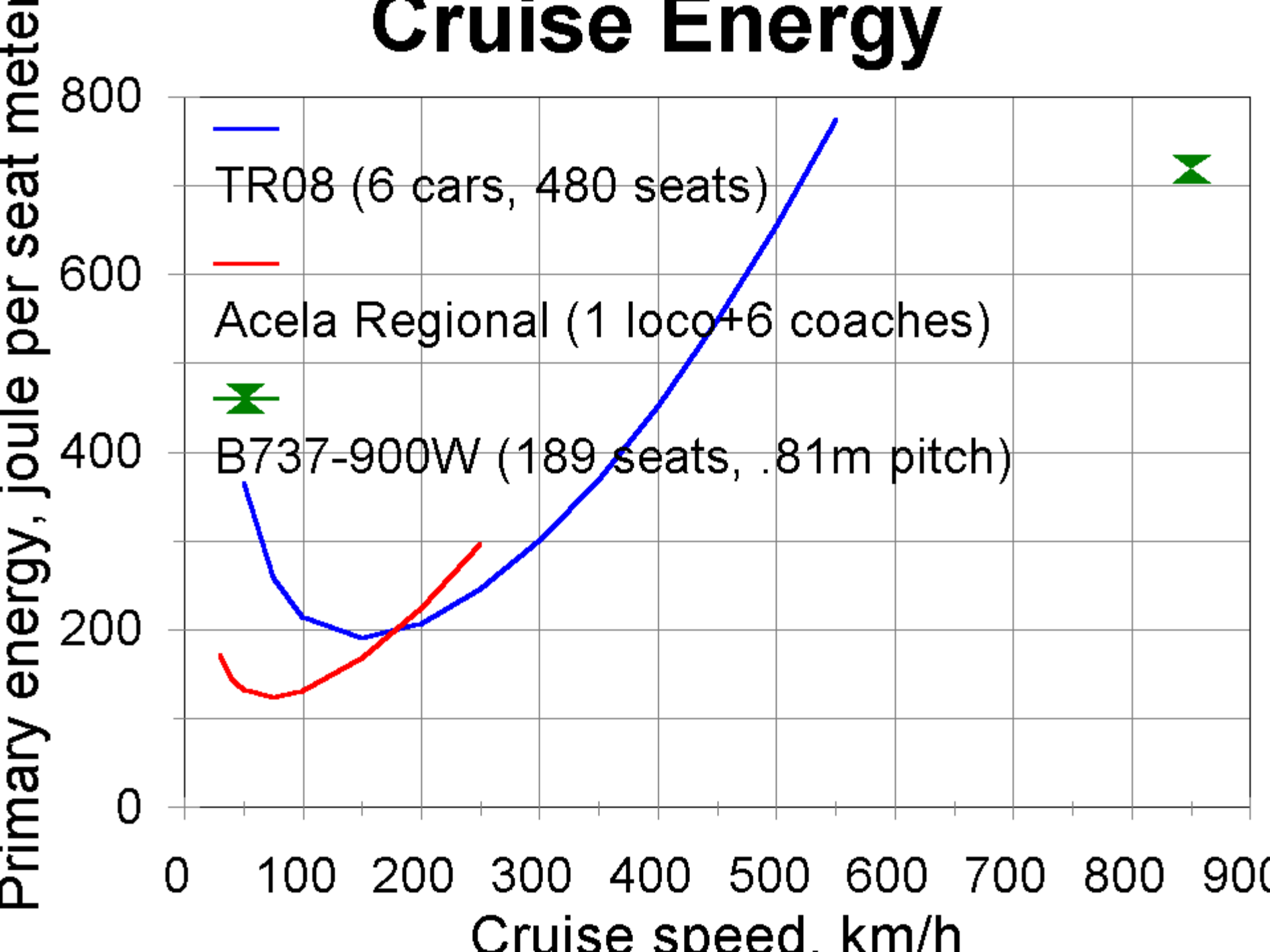

ALLEGHENY COUNTY
B1
Allegheny River
B4
B4 East
B4 West
Plum
Penn Hills
City of Pittsburgh
279
376
North Shore Maglev Station
Ohio River
B2
Steel Plaza Maglev Station
Thompson Run Maglev Station
Monroeville Indust. Park Maglev Station
Tidi Plaza Maglev Station
Station Square Maglev Station
B3
Monongahela River
Monroeville Mall Maglev Station
Monroeville
LEGEND
The Pennsylvania High-Speed Maglev Project
Recommended Maglev Station Location
Maglev Station Location Not Recommended for Further Consideration
Recommended Alternative
Alternative Not Recommended for Further Consideration
Pittsburgh to Penn Hills/Monroeville Alternative Alignment Map
Kilometers
Miles


FN
SHIMONOSEKI
Ō Shima
95
Ashiya
KITA-KYŪSHŪ
Kanezaki
Adachi Yama
598
Genkai
Okagaki
Mizumaki
Munakata
Nakama
Tsuyazaki
Kurate
Kanda
ino Shima
Fukuma
Nōgata
Koga
Wakamiya
Yukuhash
Miyata
Kanada
Toyotsu
Kotake
Kawara
Sbika
Tagawa
Saigawa
Sasaguri
Iizuka
FUKUOKA
Kawasaki
Honami
Inatsuki
Sue
Susenji
Umi
Usui
Soeda
Onojō
Yamada
Kyōyomi
Kasuga

Maglev/HSR Speed Comparison

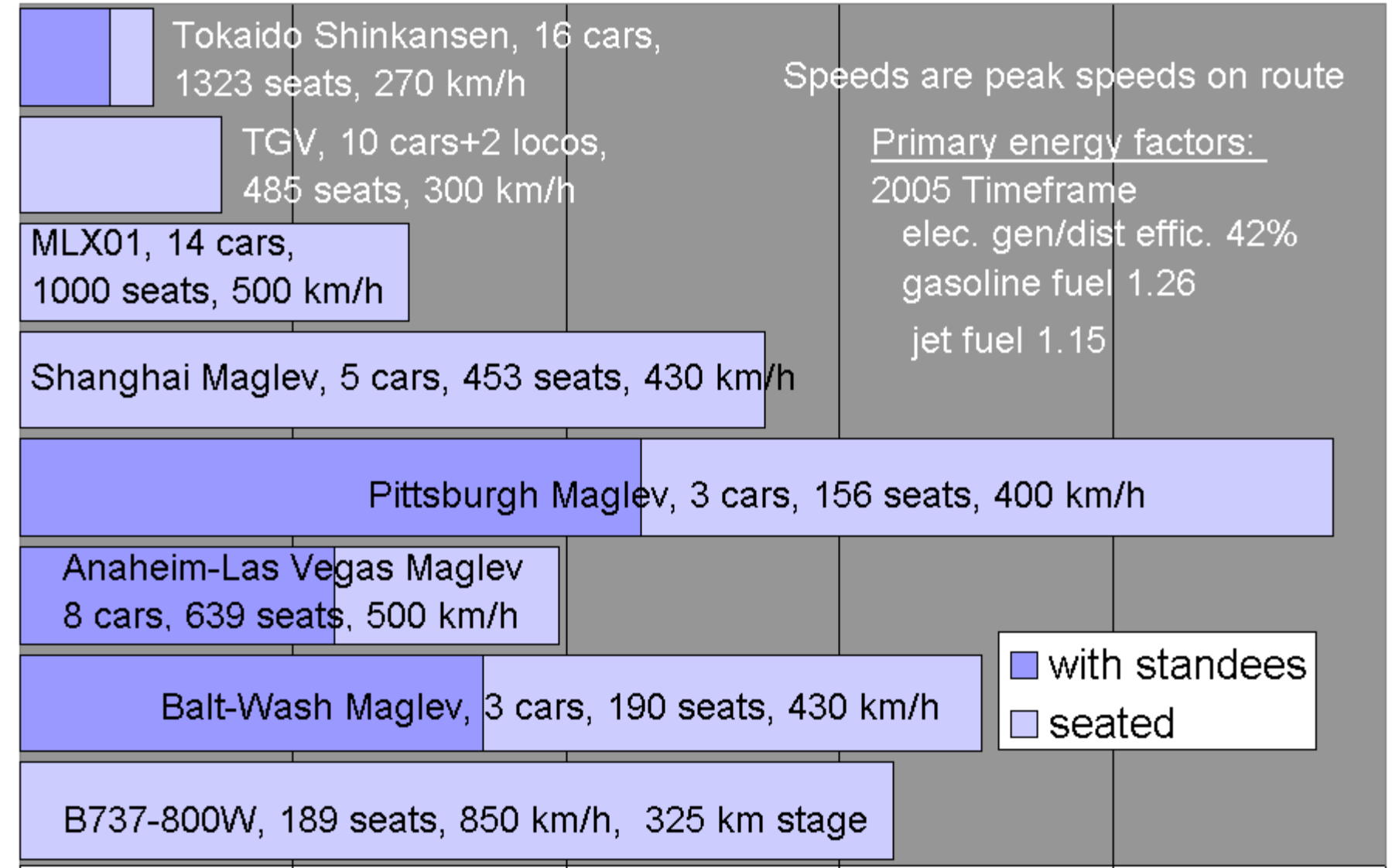
based on direct distances

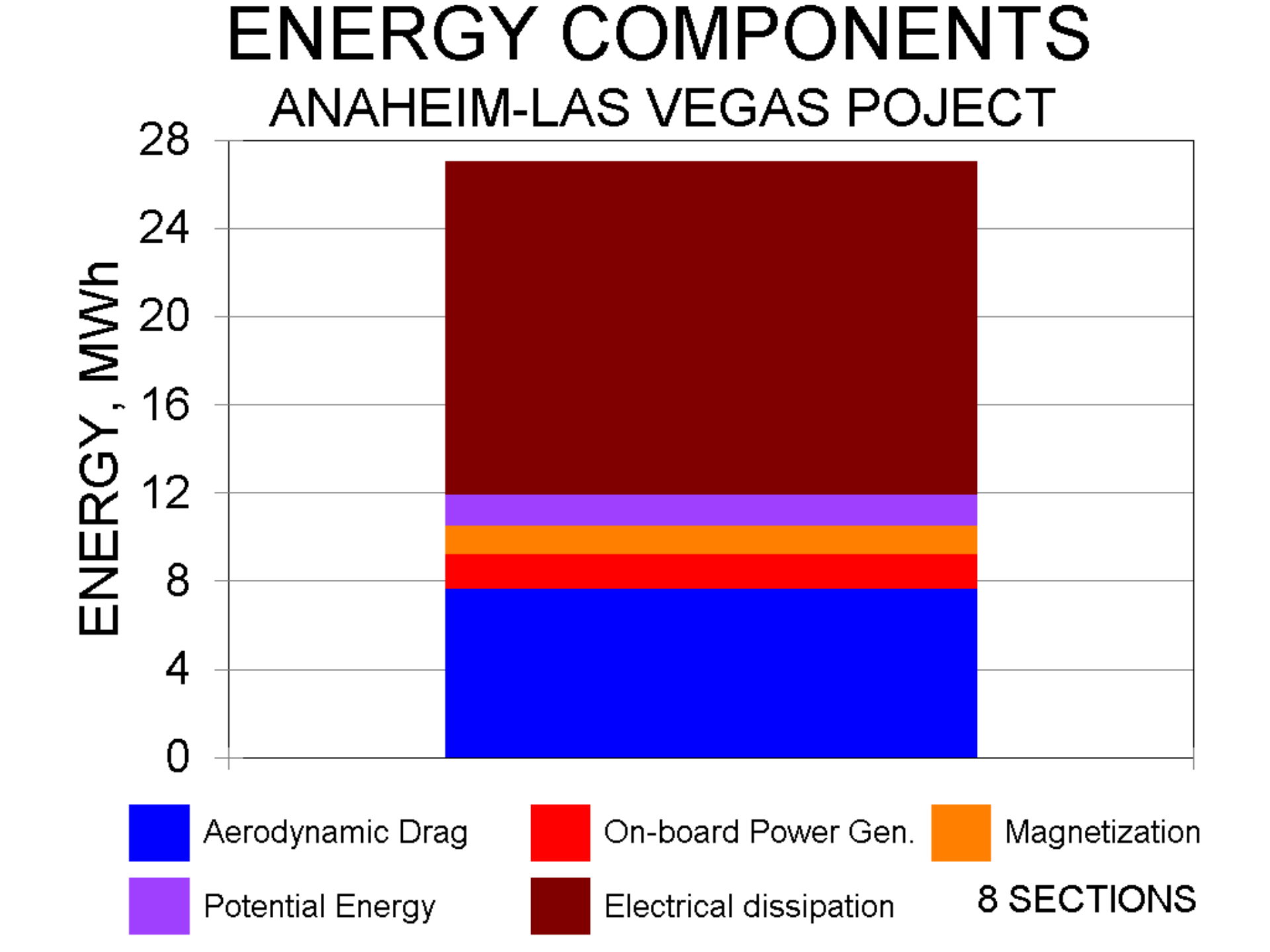



Cruise Energy
Primary energy, joule per seat meter
800
600
400
200
0
TR08 (6 cars, 480 seats)
Acela Regional (1 loco+6 coaches)
B737-900W (189 seats, .81m pitch)
0
100
200
300
400
500
600
700
800
900
Cruise speed, km/h

ENERGY INTENSIVENESS COMPARISON

based on standing/seated capacity, primary energy and direct distance




ENERGY COMPONENTS
ANAHEIM-LAS VEGAS POJECT
ENERGY, MWh
28
24
20
16
12
8
4
0
Aerodynamic Drag
On-board Power Gen.
Magnetization
Potential Energy
Electrical dissipation
8 SECTIONS

Transfer of AMT Maglev Vehicle to Old Dominion University

Guideway construction completed in 39 days

Vehicle and elevated guideway
- Levitated
- Shakedown tests